WHAT IS CLAIMED IS:

1. An instrumented pin member, comprising:

a pin member body disposed about a pin member axis, the pin member body comprising a bending portion;

a sensing device positioned at the pin member body within the bending portion for sensing a bending strain in the bending portion exclusive of a net axial strain, and for outputting a sensor measurement signal representative of the bending strain; and

a sensor measurement signal output device for outputting the sensor measurement signal from the sensor device.

2. An instrumented pin member as recited in claim 1, wherein the sensing device senses components of the bending strain in the bending portion along an x axis and a y axis, the x axis and the y axis being orthogonal to the pin member axis and to each other.

3. An instrumented pin member as recited in claim 1, wherein the pin member body comprises a bolt.

4. An instrumented pin member as recited in claim 1, wherein the pin member body has a cylindrical shape about the pin member axis.

5. An instrumented pin member as recited in claim 1, wherein:

the pin member body comprises a head; and

the bending portion is adjacent to the head.

6. An instrumented pin member as recited in claim 1, wherein the sensing device comprises:

first and second x-axis sensor elements for measuring the bending strain along the x axis; and

first and second y-axis sensor elements for measuring the bending strain along the y axis.

7. An instrumented pin member as recited in claim 6, wherein each of the first and second x axis sensor elements comprises an axial sensor for sensing strain in a pin member axial direction corresponding to the pin member axis.

8. An instrumented pin member as recited in claim 6, wherein:

the pin member body comprises a shank including a shank perimeter lying in a plane orthogonal to the pin member axis; and

each of the first and second x axis sensor elements comprises a tangential sensor for sensing strain in a tangential direction tangential to the shank perimeter.

9. An instrumented pin member as recited in claim 6, wherein each of the first and second y axis sensor elements comprises an axial sensor for sensing strain in a pin member axial direction corresponding to the pin member axis.

10. An instrumented pin member as recited in claim 6, wherein:

the pin member body comprises a shank including a shank perimeter lying in a plane orthogonal to the pin member axis; and

each of the first and second y axis sensor elements comprises a tangential sensor for sensing strain in a tangential direction tangential to the shank perimeter.

11. An instrumented pin member as recited in claim 6, wherein:

each of the first and second x axis sensor elements and each of the first and second y axis sensor elements comprises an axial sensor for sensing strain in a pin member axial direction corresponding to the pin member axis;

the pin member body comprises a shank including a shank perimeter lying in a plane orthogonal to the pin member axis; and

each of the first and second x axis sensor elements and each of the first and second y axis sensor elements comprises a tangential sensor for sensing strain in a tangential direction tangential to the shank perimeter.

12. An instrumented pin member as recited in claim 7, wherein:

the sensing device comprises

an x axis bridge having a left side and a right side, the left x axis bridge side comprising first and second positions and the right x axis bridge side comprising first and second positions,

the first position of the left x axis bridge side and the first position of the right x axis bridge side being in a first aligned x axis configuration, and

the second position of the left x axis bridge side and the second position of the right x axis bridge side being in a second aligned x axis configuration,

the axial sensors of the first and second x axis sensor elements being in one of the first aligned x axis configuration and the second aligned x axis configuration.

13. An instrumented pin member as recited in claim 7, wherein the sensing device comprises:

an x axis bridge having a left side and a right side, the left x axis bridge side comprising first and second positions and the right x axis bridge side comprising first and second positions,

the first position of the left x axis bridge side and the first position of the right x axis bridge side being in a first aligned x axis configuration, and

the second position of the left x axis bridge side and the second position of the right x axis bridge side being in a second aligned x axis configuration; and

an axial stress measurement configuration and a bending stress measurement configuration,

the sensing device being in the bending stress measurement mode when the axial sensors of the first and second x axis sensor elements are in one of the first aligned x axis configuration and the second aligned x axis configuration.

14. An instrumented pin member as recited in claim 13, wherein the sensing device is in the axial stress measurement configuration when the axial sensors of the first and second x axis sensor elements are not in one of the first aligned x axis configuration and the second aligned x axis configuration.

15. An instrumented pin member as recited in claim 8, wherein:

the sensing device comprises

an x axis bridge having a left side and a right side, the left x axis bridge side comprising first and second positions and the right x axis bridge side comprising first and second positions,

the first position of the left x axis bridge side and the first position of the right x axis bridge side being in a first aligned x axis configuration, and

the second position of the left x axis bridge side and the second position of the right x axis bridge side being in a second aligned x axis configuration,

the tangential sensors of the first and second x axis sensor elements being in one of the first aligned x axis configuration and the second aligned x axis configuration.

16. An instrumented pin member as recited in claim 11, wherein the sensing device comprises:

an x axis bridge having a left side and a right side, the left x axis bridge side comprising first and second positions and the right x axis bridge side comprising first and second positions,

the first position of the left x axis bridge side and the first position of the right x axis bridge side being in a first aligned x axis configuration, and

the second position of the left x axis bridge side and the second position of the right x axis bridge side being in a second aligned x axis configuration; and

an axial stress measurement configuration and a bending stress measurement configuration,

the sensing device being in the bending stress measurement mode when the tangential sensors of the first and second x axis sensor elements are in one of the first aligned x axis configuration and the second aligned x axis configuration.

17. An instrumented pin member as recited in claim 16, wherein the sensing device is in the axial stress measurement configuration when the tangential sensors of the first and second x axis sensor elements are not in one of the first aligned x axis configuration and the second aligned x axis configuration.

18. An instrumented pin member as recited in claim 9, wherein:

the sensing device comprises

a y axis bridge having a left side and a right side, the left y axis bridge side comprising first and second positions and the right y axis bridge side comprising first and second positions,

the first position of the left x axis bridge side and the first position of the right y axis bridge side being in a first aligned y axis configuration, and

the second position of the left y axis bridge side and the second position of the right y axis bridge side being in a second aligned y axis configuration,

the axial sensors of the first and second y axis sensor elements being in one of the first aligned y axis configuration and the second aligned y axis configuration.

19. An instrumented pin member as recited in claim 18, wherein the sensing device comprises an axial stress measurement configuration and a bending stress measurement configuration,

the sensing device being in the bending stress measurement mode when the axial sensors of the first and second y axis sensor elements are in one of the first aligned y axis configuration and the second aligned y axis configuration.

20. An instrumented pin member as recited in claim 19, wherein the sensing device is in the axial stress measurement configuration when the axial sensors of the first and second y axis sensor elements are not in one of the first aligned opposed y axis configuration and the second aligned y axis configuration.

21. An instrumented pin member as recited in claim 10, wherein:

the sensing device comprises

a y axis bridge having a left side and a right side, the left y axis bridge side comprising first and second positions and the right y axis bridge side comprising first and second positions,

the first position of the left x axis bridge side and the first position of the right y axis bridge side being in a first aligned y axis configuration, and

the second position of the left y axis bridge side and the first position of the right y axis bridge side being in a second aligned y axis configuration,

the tangential sensors of the first and second y axis sensor elements being in one of the first aligned y axis configuration and the second aligned y axis configuration.

22. An instrumented pin member as recited in claim 21, wherein the sensing device comprises an axial stress measurement configuration and a bending stress measurement configuration,

the sensing device being in the bending stress measurement mode when the axial sensor of the first and second y axis sensor elements are in one of the first aligned x axis configuration and the second aligned y axis configuration.

23. An instrumented pin member as recited in claim 22, wherein:

the sensing device is in the axial stress measurement configuration when the axial sensors of the first and second y axis sensor elements are not in one of the first aligned y axis configuration and the second aligned y axis configuration.

24. An instrumented pin member as recited in claim 11, wherein:

the sensing device comprises

an x axis bridge having a left side and a right side, the left x axis bridge side comprising first and second positions and the right x axis bridge side comprising first and second positions,

the first position of the left x axis bridge side and the first position of the right x axis bridge side being in a first aligned configuration, and

the second position of the left x axis bridge side and the second position of the right x axis bridge side being in a second opposed configuration,

the axial sensors of the first and second x axis sensor elements being in one of the first aligned x axis configuration and the second aligned x axis configuration, and the tangential sensors of the first and second x axis sensor elements being in

the other of the first aligned x axis configuration and the second aligned x axis configuration;

the sensing device further comprises

a y axis bridge having a left side and a right side, the left y axis bridge side comprising first and second positions and the right y axis bridge side comprising first and second positions,

the first position of the left x axis bridge side and the first position of the right y axis bridge side being in a first aligned configuration, and

the second position of the left y axis bridge side and the second position of the right y axis bridge side being in a second aligned configuration,

the axial sensors of the first and second y axis sensor elements being in one of the first aligned y axis configuration and the second aligned y axis configuration, and the tangential sensors of the first and second y axis sensor elements being in the other of the first aligned y axis configuration and the second aligned y axis configuration.

25. An instrumented pin member as recited in claim 1, wherein the sensing device comprises a bridge assembly having an axial stress measurement configuration and a bending stress measurement configuration.

26. An instrumented pin member as recited in claim 1, further comprising a switching device operatively coupled to the sensing device for switching between an axial stress measurement configuration and a bending stress measurement configuration.

27. An instrumented pin member as recited in claim 26, wherein the switching device comprises a solid state switching circuit.

28. An instrumented pin member as recited in claim 26, wherein:

the pin member comprises a head; and

the switching device is positioned at the pin member head.

29. An instrumented pin member as recited in claim 28, wherein:

the pin member head includes an external surface and a notch disposed in the external surface; and

the switching device is mounted to the external surface.

30. An instrumented pin member as recited in claim 26, wherein:

the pin member comprises a head including a head cavity; and

the switching device is positioned at the pin member head cavity.

31. An instrumented pin member as recited in claim 26, wherein the switching device comprises a periodic switching signal source for providing a periodic switching signal.

32. An instrumented pin member as recited in claim 26, wherein:

the instrumented pin member further comprises a switching device operatively coupled to the bridge assembly for switching between the axial stress measurement configuration and the bending stress measurement configuration.

33. An instrumented pin member as recited in claim 26, wherein:

the sensing device comprises a pair of bridges each having an axial stress measurement configuration and a bending stress measurement configuration; and

the switching device comprises a switch operatively coupled to the pair of bridges for switching the pair of bridges between the axial stress measurement configuration and the bending stress measurement configuration.

34. An instrumented pin member as recited in claim 3, wherein the switching device switches the pair of bridges to the bending stress measurement configuration substantially simultaneously.

35. An instrumented pin member, comprising:

a pin member body disposed about a pin member axis, the pin member body comprising a bending portion;

a sensing device positioned on the pin member body within the bending portion for sensing a bending stress in the bending portion during a bending stress measurement mode and for outputting a sensor measurement signal;

a switching device operatively coupled to the sensing device for switching the sensing device in and out of the bending stress measurement mode; and

a sensor signal output device for communicating the sensor measurement signal.

36. A system for measuring bending at a joint, the system comprising:

an instrumented pin member disposed at the joint, the instrumented pin member comprising

a pin member body disposed about a pin member axis, the pin member body comprising a bending portion,

a sensing device positioned at the pin member body within the bending portion for sensing a bending strain in the bending portion exclusive of a net axial strain, and for outputting a sensor measurement signal representative of the bending strain, and

a sensor measurement signal output device for outputting the sensor measurement signal from the sensor device; and

a data receiving device operatively coupled to the sensor measurement signal output device for receiving the sensor output signal.

37. A system as recited in claim 36, wherein the instrumented pin member further comprises a switching device operatively coupled to the sensing device for switching the sensing device in and out of a bending stress mode.

38. A system as recited in claim 36, wherein the system comprises a plurality of the instrumented pin members.

39. A system as recited in claim 36, wherein the data receiving device comprises a data processor.

40. A system as recited in claim 36, wherein the data receiving device comprises a data display.

41. A method for measuring bending at a joint, the method comprising:

disposing an instrumented pin member at the joint, the instrumented pin member comprising a pin member body disposed about a pin member axis, the pin member body comprising a bending portion,

sensing a bending strain in the bending portion exclusive of a net axial strain during a bending stress measurement mode and outputting a sensor measurement signal, and

communicating the sensor measurement signal to a data receiving device.

42. A method as recited in claim 41, wherein the disposing of the instrumented pin member comprises disposing a plurality of the instrumented pin members at the joint so that the instrumented pin members are substantially equally spaced about the joint.

43. A method as recited in claim 41, wherein the sensing includes switching in and out of the bending stress measurement mode.